



Unit 3 – Rational Functions

Chapter 5.4: Solving Rational Equations

Example 1: solve the following.

a) $\frac{x+3}{x-4} = \frac{x-1}{x+2}$

b) $\frac{1}{x} + \frac{1}{x-3} = \frac{1}{2}$

Example 2: When Stuart and Lucy work together, they can deliver flyers to all the homes in their neighborhood in 42min. When Lucy works alone, she can finish the delivery in 13mins less time than Stuart can when he works alone. Determine the time that Stuart takes to deliver the flyers when he works alone.

Solution:

Let s minutes be the time that Stuart takes to deliver the flyers when working alone.

Lucy takes $(s - 13)$ minutes when working alone.

The fraction of deliveries made in one minute:

- by Stuart working alone is $\frac{1}{s}$
- by Lucy working alone is $\frac{1}{s-13}$
- by Stuart and Lucy working together is $\frac{1}{42}$

The efficiency of delivering flyer per minute can be cumulated as $\frac{1}{42}$, i.e., they could deliver $\frac{1}{42}$ of the flyer per minute.

Hence:



Example 3: Rima bought a case of concert T-shirts for \$450. She kept two T-shirts for herself and sold the rest for \$560, making a profit of \$10 on each T-shirt. How many T-shirts were in the case?

Let the number of T-shirts in the case be x .

- Buying price per T-shirt = $\frac{450}{x}$
- Selling price per T-shirt = _____

The profit of \$10 on each T-shirt basically is the difference between the selling price and the buying price.

Hence

Extra practice:

1. Ero and Jamal set off at the same time on a 30-km walk for charity. Ero, who has trained all year for this event, walks 1.4 km/h faster than Jamal, but sees a friend on the route and stops to talk for 20 min. Even with this delay, Ero finishes the walk 2 h ahead of Jamal. How fast was each person walking, and how long did it take for each person to finish the walk?
2. On the 42-km go-cart course at Sportsworld, Arshia drives 0.4 km/h faster than Sarah, but she has engine trouble part way around the course and has to stop to get the go-cart fixed. This stop costs Arshia one-half hour, and so she arrives 15 min after Sarah at the end of the course. How fast did each girl drive and how long did each girl take to finish the course? Answer to one decimal place.
3. Rowing at 8 km/h, in still water, Rima and Bhanu take 16 h to row 39 km down a river and 39 km back. Find the speed of the current to two decimal places.
4. A river flows at 2 km/h, and John takes 6 h to row 16 km up the river and 16 km back. How fast did he row?
5. Jaime bought a case of concert T-shirts for \$450. She kept two for herself and sold the rest for \$560, making a profit of \$10 on each shirt sold. How many shirts were in the case?
6. Stuart agrees to a house-painting job for \$900. He takes 4 days longer than expected, and he has earned \$18.75 less per day than expected. In how many days did he expect to complete the house?

Suggested questions from Textbook: Pg286. # 6abc, 9, 10, 12, 13



Unit 3 – Rational Functions

Chapter 5.5: Solving Rational Inequalities

DO NOT CROSS MULTIPLY

Example 1: Solve.

a) $x - 1 < \frac{12}{x}$

b) $\frac{x}{x-1} \leq \frac{5x-3}{(x-1)(x+1)}$

Practice:

The equation $f(t) = \frac{5t}{t^2 + 3t + 2}$ models the bacteria count, in thousands, for a sample of tap water that is left to sit over time, t , in days. The equation $g(t) = \frac{15t}{t^2 + 9}$ models the bacteria count, in thousands, for a sample of pond water that is also left to sit over several days. In both models, $t > 0$. Will the bacteria count for the tap water sample ever exceed the bacteria count for the pond water?

Suggested problem from textbook: pg296. # 6, 11



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